REMARKS

Applicants appreciate the Examiner's thorough consideration provided the present application. Claims 1-13 are now present in the application. Claim 13 has been amended. Claim 1 is independent. Reconsideration of this application, as amended, is respectfully requested.

Claim Rejections Under 35 U.S.C. §101

Claim 13 stands rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. This rejection is respectfully traversed.

In view of the foregoing amendments, it is respectfully submitted that this rejection has been addressed. Reconsideration and withdrawal of the rejection under 35 U.S.C. § 101 are therefore respectfully requested.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-6 and 8-13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Khosravi, U.S. Patent No. 7,200,146. Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Khosravi in view of Oprescu, U.S. Patent No. 5,784,557. These rejections are respectfully traversed.

Independent claim 1 recites a combination of elements including "[m]ethod for deadlock free altering of a network routing from a first routing function Rold, defining an established connection between a plurality of communication input ports Il,..,In and output ports Ol,..,Om, in a network element, to a second routing function Rnew, defining an new connection between the

said input and output ports, for execution by the network element for transmitting and receiving data packets, said method comprising: (1) for each input port Ii, performing the following steps: (1a) applying the first routing function Rold for the input port, (1b) receiving a token on an input port Ii, (1c) applying the second routing function Rnew for the input port Ii, (1d) forwarding data packets to every output port Oj associated with the input port Ii according to the second routing function Rnew, provided that the output port Oj has transmitted the token, (2) for each output port Oj, performing the following steps; (2a) determining if the token has been received on all input ports associated with the output port Oj according to the first routing function Rold, (2b) transmitting the token on the output port Oj when the token has been received on all said input ports." Applicants respectfully submit that the above combination of steps as set forth in independent claim 1 is not disclosed nor suggested by the references relied on by the Examiner.

Khosravi discloses a method for reconfiguring internal FEs (switches) in an IP router as a consequence of external IP-route changes. Since IP networks may drop packets, deadlock is not an issue for Khosravi as opposed to the present invention.

The present invention considers deadlock free re-configuration of interconnection networks within supercomputers. A deadlock occurs when a set of packets cannot proceed in the network. This occurs when none of the packets in the set can proceed first, because the next buffer space needed on the way to the destination (this buffer space may be at the opposite side of a link) is occupied by another packet in the same set. This is a problem specific to networks with flow control on the link level. Therefore, the deadlock problem only occurs in networks that do not drop packets. Such networks are currently primarily found within supercomputers.

The problem solved by Khosravi is routing of changes imposed externally to FEs internally in the switch. As mentioned, the deadlock problem is not mentioned in Khosravi. This is natural because in IP networks packets can be dropped so that deadlocks do not occur. Unlike Khosravi, the present invention is to reconfigure a network without creating deadlocks.

Khosravi changes routing functions in one FE at a time (see Fig. 7) and *in arbitrary order*. For this reason, Khosravi does not describe a method that is deadlock free. In fact, Khosravi never intends to do so either. In addition, Khosravi operates in an environment that may discard packets. Therefore, the deadlock is no concern to Khosravi. On the other hand, the present invention starts using a new routing table on one input port at a time (See Fig. 6). The *order* in which the input ports and switches start using the new routing table according to the present invention is important to make the process deadlock free.

In addition, the present invention stalls packets that should use the new routing function, but which are destined for an output port that is not allowed to take such packets yet (See Fig. 6 and claim 1). This aspect can avoid the creation of deadlocks. Unlike the present invention, Khosravi does not propose stalling packets as recited in claim 1, not mention the fact that Khosravi's method has nothing to do with the deadlock problem, and was not intended to be so.

With respect to claim 7, the examiner states that Oprescu teaches reducing the cyclic dependency graph to a non-cyclic dependency graph. Again, Applicants respectfully disagree. In particular, what Oprescu describes is a way to prune a *topology* with cycles so that it becomes one without cycles. Although not specifically stated in the present application, a dependency graph is not a topology. It is a graph where channels are considered as nodes, and

the dependencies are dependencies between channels. There is a dependency from channel a to channel b if and only if the routing function will make some packets use channel b immediately after having used channel a. This means that the channels a and b must be directly connected to the same switch, and that this switch forwards packets from a to b. Pruning the dependency graph as suggested in the present application is therefore not the same thing as pruning the topologies. Changing the routing function so that the dependency graph becomes acyclic, as suggested in the present application, will leave the topology unchanged, with cycles and everything intact. This process is not described by Oprescu.

In addition, the present invention suggests doing this as a preparing step before the main reconfiguration in order to make the present reconfiguration process applicable to adaptive routing functions. This feature is clearly absent from the utilized references.

Accordingly, neither of the references utilized by the Examiner individually or in combination teaches or suggests the limitations of amended independent claim 1 or its dependent claims. Therefore, Applicants respectfully submit that claim 1 and its dependent claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. §§ 102 and 103 are respectfully requested.

CONCLUSION

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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